

AUGUSTUS FENDLER (1813–1883), PROFESSIONAL PLANT COLLECTOR: SELECTED CORRESPONDENCE WITH GEORGE ENGELMANN

MICHAEL T. STIEBER¹ AND CARLA LANGE†

ABSTRACT

Augustus Fendler, a German-American interested in speculative physics, meteorology, and botany, was the first person to collect plants in the area around Santa Fe, New Mexico, in 1846. His life can be partly documented through his correspondence with George Engelmann and Asa Gray, both of whom esteemed Fendler's friendship and expertise as a plant collector. Many of Fendler's letters to Engelmann were written in German; the originals at the Missouri Botanical Garden have been translated into English by the second author and were used extensively to create the following biography.

During the nineteenth century a small number of people who preferred to seek their livelihood far from the madding crowd chose the arduous life of the plant collector. Although the hardships of this *modus vivendi* attracted some, the exploration of nature's diversity—and doing so at one's own pleasure—lured most. For Augustus Fendler the quest for plants provided a haven for his "painfully diffident" personality and inquiring mind (Canby, 1885). His philosophy practically coincided with that of his more famous contemporaries, Emerson and Thoreau, as may be seen in Fendler's privately published "Mechanism of the Universe" and in his letters. Despite his shyness or perhaps because of it, Fendler won the lasting affection of William Marriott Canby, Asa Gray, and George Engelmann. In their own ways these three persons contributed greatly to floristic botany in North America during the 1800s. Fendler enriched the herbaria of all three as well as those of others who purchased sets of plants from him.

The summer following Fendler's birth on 10 January 1813 in Gumbinnen, East Prussia, his father died, but he soon acquired a stepfather. Although for some years the boy attended school, he eventually had to leave because his family could not afford the tuition. Apprenticed to the town clerk, he soon found this a "spirit-killing employment," and when given the opportunity to accompany a government physician on an inspection tour of cholera quarantine stations along the Russian border, young Fendler volunteered, even though he had to clerk for the doctor (Canby, 1885). When Fendler returned to Gumbin-

nen, he learned the tanning trade, hoping that this would allow him to earn a living anywhere he might travel. Tanning, however, so exhausted and, at times, nauseated the frail youth that Augustus decided to enroll in the Royal *Gewerbe Schule*, a polytechnical school in Berlin. But after one successful year there, the daily schedule had so drained his strength that in the Fall of 1835 he withdrew. Following a period of wandering in German cities, he sailed from Bremen for Baltimore, Maryland, in 1836. With little cash in his pockets he sought and found work in a tannery in Philadelphia, but he quickly abandoned that for lamp manufacturing in New York City, which proved to be a more profitable occupation in lean years ahead. However, the money crisis and panic of 1837 so depressed the business that he was forced to quit the factory in the Spring of 1838. Even before the hard times of 1837, Augustus had read of the opportunities to be found in St. Louis and the Far West.

After thirty days via canal-boat and steamer from Albany through Buffalo, Cleveland, and Portsmouth, Fendler finally reached the Mississippi city of 13,000 people. He worked for a time with a man "who had just commenced making spirit-gas for lighting public houses, as the manufacture of coal-gas had not reached so far west" (Canby, 1885). The prospect of working through the winter in an unheated room so discouraged Fendler, however, that he departed for the South shortly before Christmas in 1838, knapsack on his back. He walked through the forests of southern Illinois, the canebrakes of Kentucky and part of Tennessee before meeting two other wayfar-

¹ Hunt Institute for Botanical Documentation, Carnegie-Mellon University, Pittsburgh, Pennsylvania 15213.

ers. The three bought an old skiff just below the Ohio River's mouth and managed to float a good distance before finally sighting a steamboat that had broken through the winter ice upriver. His inborn wanderlust urged him westward; so he left New Orleans for Galveston, Texas, in January 1839. Not finding Galveston particularly inviting—he described it as “a dozen poor-looking houses scattered about its low and sandy surface” (Canby, 1885)—Fendler tried Houston. He explored the area and almost settled there, which would have been simple under the immigrant land grant law, but he had no interest in fighting Comanches for the right to secure his claim. After he returned from the then unsettled area known as Austin the ravages of yellow fever that greeted him at Houston clinched his decision. His wallet empty and his body fever-weakened, Fendler was forced to retreat north to Illinois, where he taught school for a short time.

At this time, possessed by a particularly acute case of transcendentalism, Fendler wrote in his own “autobiography” (referring to himself in the third person) something akin to Thoreau's *Walden*:

Autumn in North America, and especially in the Western States, always presented more charms to F.'s mind than any other part of the year. Hence in 1841, when autumn winds began to scatter the falling forest leaves, he was seized with an uncontrollable desire for solitary life in the wild woods, removed from the haunts of man, in short, for the independent life of a hermit. In his search for a proper place, he came upon a little village called Wellington, situated on the banks of the Missouri River, three hundred miles above St. Louis. Here he learned that an uninhabited island, two and a half miles long, called Wolf's Island, not very far below the village, was at his service.

Without delay, F. packed his little baggage, including some bed-clothes and cooking utensils, a rifle, an axe and some books, in a canoe, also taking along some provisions, and started for his new home. This island was densely wooded with gigantic trees. On the lower part of it, farthest removed from the village, was an old, dilapidated log cabin, the former abode of some woodchoppers. The upper part of the chimney was gone, so that a tall man standing on the outside of it could look down inside upon the low fire-

place, from the burrows of which wild rabbits popped forth at the approach of man; part of the roof was gone, and the door carried off. There was plenty of game, however, especially wild turkeys. These latter had chosen the island as a roosting place for the night and as a place of safe retreat in daytime when chased on the mainland by hunters. In a so-called “turkey-pen” they were easily entrapped, and thus an abundance of excellent food secured. To return the borrowed canoe to its owner and to make one of his own was his first aim. So he went to work at a big trunk of a prostrate tree, and with an axe shaped part of it into proper form of a light canoe eight feet long.

Removed from the crowd, the hum and strife of men, his pastimes consisted alternately in trapping, hunting, reading, musing and meditating, and on mild and sunny days in paddling up a placid arm of the river, then turning round lean idly back in his canoe, thus floating home again. Occupied in this way F. lived for about six months, enjoying the sweets of solitude with a satisfaction of inward peace of mind and bliss higher than he had expected—contented and happy as ever mortal man, similarly situated, can claim to be. His feelings of content would at times culminate into feelings of thankfulness, which then found vent in words akin to the soliloquy of Faust at his forest cave: “Spirit sublime! Thou unto me gav'st ev'ry thing I pray for.”

Only once he met on the island with a human being, namely, with its owner, coming to see him. How long F. would have continued to live here is hard to say, if the great spring rise in the Missouri River, which began to overflow part of the island, had not taken place. When its waters rose to within a short distance of his cabin he thought 'twas time to leave, and entrusting himself and baggage to his frail canoe, was hurried along at no mean speed by the precipitate rush of the foaming and rapidly swelling stream. Dodging floating logs and broken ledges of ice, he expected every moment to be swamped by the high waves caused by a stiff breeze blowing up stream. To land his tiny craft amidst eddies and whirlpools at Lexington, ten miles below the island, was, how-

ever, the most perilous part of the venture (Canby, 1885).

While the somewhat utopian life of an ensconced hermit always attracted Fendler, a fascination for travel constantly lured him away from it. In 1844 he returned to Germany for a visit home. A Koenigsberg professor of botany, Ernst Meyer, aroused Fendler's interest in plant collecting. Encouraged that he could make a decent living by collecting plants and selling the specimens to foreign herbaria, Fendler returned to St. Louis, this time with his brother, and began in earnest to collect as the seasons changed, between Chicago and New Orleans. He took his excellently prepared plants to the local expert, Dr. George Engelmann, whom he had met the year before, for identification. When in Houston Fendler had first learned of plant collecting from one of Engelmann's collectors, another German, Ferdinand Jacob Lindheimer, but he had thought nothing more of it as a profession until Ernst Meyer had suggested it. Lindheimer warned him of the hazards of life in the untamed West, where he would have to conquer plains and mountains, drive a wagon, survive on buffalo meat or worse rations, live in the saddle or walk twenty miles a day, and occasionally fight for his life against the natives. Lindheimer, Fendler and others who accepted this vocation never had time to learn enough botany to work on their own collections, but they developed a keen sense of the new and unusual, which profited science in the end (Dupree, 1959: 156). Plying their trade, these pioneers for botany steadily grew unused to the discipline and courtesies required in civilized life, so they generally could not stand the cities for long, but sought refuge in the country. This, of course, suited Fendler's shy and retiring nature perfectly.

In time, Engelmann and Fendler became fast friends. The doctor recognized Fendler's botanical promise and communicated such to Asa Gray. The latter, who never lost an opportunity to get plants from the Far West when he could, secured a letter from the Secretary of War, authorizing the Army, then at war with Mexico, to provide the collector with free transportation and provisions to Santa Fe and back. Since his was the first botanical trip in that part of the country, it has recently been the focus of some historical attention (Shaw, 1982). Gray's *Plantae fendlerianae novi-mexicanae* (1849) appropriately accounted for this classical plant collection.

Engelmann's keenness for cacti brought observations from his new field collector, which incidentally highlights one of the many problems faced by the field botanist in obtaining specimens of large succulent plants. On 8 November 1846, this from Santa Fe:

Cactaceae can be found here in large quantities, however, barrels and cases to send them in are very hard to obtain even at the highest prices. You just cannot imagine the lack of wooden boards here; the volunteers have to use the boards of the wagon bodies in order to make caskets for their dead, and empty cases are sold by most of the merchants according to weight for 12½ cents per pound. With great efforts I was able to obtain an empty sugar barrel from the Commissary for my collected Cactaceae.

Meanwhile Gray had received some of Fendler's specimens from Santa Fe and wrote to Engelmann that Fendler had to go back, because his specimens were excellent. Gray said that they would sell well, too, but lamented that if only Fendler had known more botany, he would have eschewed the "common plants" and bestowed his labor on the new ones abounding there. However, Engelmann had already perceived his collector's shortcomings and was training him. No lack of enthusiasm for "herborizing" discouraged Fendler from another trip to Santa Fe. Only basics deterred him, as he told Gray:

When my pecuniary means at Santa Fe were nearly all exhausted, when I had to sacrifice one thing after another of my most necessary effects, to keep up a few days longer the scanty support of our lives [his brother accompanied Augustus], in order to collect something more of the vegetation of that region, I looked forward with utmost confidence to those gentlemen in the East, who had induced me to go out to Santa Fe, and who would, as I hoped, leave me not without assistance as soon as I should have returned with my collections to St. Louis. It was this hope that made me bear all the difficulties most cheerfully under the happy impression that the enjoyment of the fruits of my labour would soon compensate for all.

But alas! It was to be otherwise (McKelvey, 1955).

Unfortunately Fendler had to borrow money

for sustenance while sorting the nearly 17,000 plant specimens into salable sets. His brother, also broke, enlisted in the Army. As Fendler explained his plight further:

I have expended about 200 dollars of my own money; but I gave up a business in which I was doing well, and in which I cannot at present engage again for want of means. To this may be added the sad prospect I have now before me, that by the time I shall receive some money, this money will be nearly all wanted to pay my debts which I had to contract during all this time (McKelvey, 1955).

By now Fendler knew what others doing likewise discovered, namely that plant collecting was neither the profitable nor glamorous occupation that it was sometimes thought to be. Nevertheless, Fendler resolved to try Santa Fe again, but the ensuing debacle marked his last traffic with the military.

In June 1849 ten wagon-loads of people from Wisconsin en route to California joined the Army caravan at Fort Leavenworth, Kansas. On 26 July Fendler wrote Engelmann (in English) that he had been thwarted constantly by one Captain Morris of the Mounted Riflemen whose orders Fendler's teamster had to obey. On 13 June, shortly after noon, a thunderstorm drenched the party.

We proceeded nevertheless on our journey, and the wagons soon after commenced to cross a creek (a branch of the Nemahah River). After a part of the train had passed the creek, the progress of the remaining part was stopped as I understood by the commanding officer for more than an hour, and then ordered to proceed again, while during all this time the rain was pouring down. My teamster accordingly drove on into the bed of the creek in which at this time the water was only about 18 inches deep. The wagon next before us after crossing the creek stopped for some reason or other a few minutes in getting up the bank, and my wagon was hereby prevented from going on, and obliged to stop for 5 or 6 minutes in the creek-bed. During this short interval the water in the creek began to rise very fast and all at once the back water came rushing *up* the stream with such fury as to carry logs and branches before it. The wagon that had detained us now started

ahead, but alas! it was too late for us to follow, for the mules were already swimming and all that my teamster, who was a most expert swimmer, could do was to jump into the water and cut loose the mules as soon as possible. But they got entangled in the harness and were fearfully struggling for their lives. At the risk of his own life the teamster succeeded at last to cut them all loose. One mule however died in the water, another one died the next morning and the remaining four had suffered so much from the swallowing of water, that they were in a very enfeebled condition. The water soon rose to the middle of our wagon cover far above the load. During all this time there was a number of regular soldiers and of teamsters idly looking on, smiling and wondering at the novelty of the scene. All they did do was to holler to the teamster to come out, save his own life and let the mules be drowned, but they did not even lend me a hand in pulling out the mules. My own efforts to rescue anything of baggage from being soaked by the water were too feeble, and in the attempt I came near losing my life The wagon was then abandoned to the creek. When the water had somewhat run down we unloaded most of our things, and after the rain had ceased next morning I was at the doleful work of opening and unpacking all my trunks, boxes and provisions-bundles, to spread and strew everything to the open air, and to wash the settled mud from blankets, clothes, books, paper and a hundred minor articles.

There was not a single thing that I had been able to get out before the water had soaked it, and you may judge of the loss and damage in this unfortunate event. I had laid in a stock of provisions at St. Louis for at least 6 months for two men [Augustus and his brother]. Of these provisions the sugar was nearly all dissolved, the coffee soft enough to press it flat between my fingers; into the flour the water had penetrated from 1 to 2 inches all around the sacks. I had to throw away nearly all of hard-bread, cornmeal, tea, rice, etc. Most of the medicines you kindly had put up for me were destroyed. Not to say anything about the great number of articles that were now covered by rust or otherwise damaged I will only mention here 14

reams of brown paper that I had taken along for the purpose of drying plants. Every one of these reams after being taken out of the water had its weight increased to such a degree, that I was barely able just to lift it off the ground. The creek was still too deep next day to ford it, and several wagons being on our side of the creek, Capt. Morris was obliged to lay by next day, which was a happy circumstance to me as it gave me an opportunity at least partly to dry some of my soaked baggage. A few days later, all my books had lost their covers and the leaves moulded and partly rotten for want of sufficient time in drying. But what pained me most was to see the greater part of the 1000 specimens of my Santa Fe plants that I had so carefully with so much labor and patience pasted on paper and bound to book form, fall rotten from the moulded leaves [of] the book. This was a loss that could not be restored again by money

All the plants (about 180 specimens) that I had collected during my stay about Weston, Fort Leavenworth and on the journey up to the day of disaster were completely decayed and had to be thrown away.

On 25 June Fendler reached New Fort Kearney on the Platte River at the head of Grand Island, about 300 miles from Fort Leavenworth. Although he had hoped to reach the Great Salt Lake, the condition of his mules would not allow it. For some reason Capt. Morris would not permit an emigrant to lend two mules to Fendler so his team could manage the load. After several unsuccessful negotiations with other emigrants, Fendler reluctantly joined a small Government train of three ox-drawn wagons returning to Fort Leavenworth. The Quartermaster there offered Fendler passage to Fort Laramie whence he would have to find his own way to the Great Salt Lake, but the time for this journey would have put him at the Lake in winter. "For the present," he informed Engelmann, "I only hasten to inform you of the failure of my expedition." Asa Gray, who had encouraged him to try for the Lake, sympathized with Fendler's temptation to abandon plant collecting and seek his fortune with the other forty-niners heading for the gold discovered at Sutter's Mill, for he would certainly "make more at digging gold than he ever can with plant gathering" (Dupree, 1959: 164). And Fendler was sorely tempted.

When Augustus finally arrived in St. Louis, however, he was overwhelmed by yet another series of mishaps: All his plant collections, books, travel journals and other worldly goods had been destroyed in the "Great Fire" that had swept St. Louis during his absence. This should have been enough to send him back to the lamp factory, Wolf's Island, or San Francisco. Instead, on 4 December 1849 he boarded the steamboat *Uncle Sam* bound for New Orleans, and after obtaining necessary supplies at Engelmann's expense and after fitful starts, Augustus and his brother finally sailed from Louisiana to Chagres, Panama. Between rainstorms they managed to collect some plants, but were finally driven back to New Orleans on 20 April 1850. [Fendler's field notes for his Panama trip are at US (see Stieber, 1982); his other field records are evidently lost.] "I hardly believe that there is any other part on this earth where there is so much rain and where the rainy period is comparable to that of Panama," Fendler, now settled in Camden, Wachita County, Arkansas, wrote Engelmann on 1 May. Since leaving St. Louis the previous year, the Fendlers had spent \$274 and were debtors once more. So Augustus begged Engelmann to buy his entire set of plants and peddle them from St. Louis. Meanwhile the brothers tried to raise some money from vegetable and fruit gardening. Fendler also had some insects that he wanted to send to J. L. LeConte in New York and asked Engelmann to arrange it.

He had progressed in his study of botany enough to remark to Engelmann that "the southwestern part of Arkansas where I am now may have much of interest for botany; and the flora of this area is probably a transition of the Texas flora to the middle states." Fendler also asked for books, Gray's "Illustrated Genera" and Michaux's "work about the North American trees." The sojourn in Arkansas was aborted by unproductive soil, which meant that "cash was very rare."

In June the Fendlers moved back to New Orleans, where Augustus added Gray's "Botany of the Northern United States" to his library, and it cost only seventy-five cents! In July they resettled in Memphis, Tennessee, and prospered there for the next four years by operating a gas-lamp business. It pleased Fendler to learn that Engelmann and Gray intended to name a plant after him. (*Fendlera* Engelmann et A. Gray, a new genus of Saxifragaceae, was published in the *Smithsonian Contr. Knowl.* 3: 77, 1852.) Fendler

conducted horticultural experiments in Memphis, sowing seeds of plants that he had collected in Chagres and of others that Engelmann sent him. Four species from Chagres grew well, of which “two beautiful mimosa species (both bog plants) are now 4–5 feet high, but probably won’t last very long outside” (28 September 1851). By this time Fendler had already recorded temperatures of 38 degrees and observed frost on the leaves. Meanwhile the chemical-oil business was succeeding so well that Fendler had to abandon collecting and also most of his reading. The latter enjoyment had so increased his proficiency in English that by the 1870s he had translated Goethe’s *Faust* into English verse (Canby, 1885), presumably for his own pleasure.

Fendler reported his exact observations on the growing plants to Engelmann and his daily meteorological measurements to the Smithsonian Institution. “I found that the thermometric studies made by the local Navy-Yard here and sometimes published are very different from mine,” he wrote on 1 March 1853. In fact, he continued,

during a whole month not one single item agreed with mine. Only one example: 3rd February 1852

	sunrise 3 p. m.	
according to my obser-		
vation	28°	64°
Navy-Yard—	47°	48°

There seems to be no difference between the thermometers themselves since on the 19th of January 1852 both showed at sunrise – 2°F . . . So much for official meteorological statements of the local Navy-Yard

Meanwhile his gas-lighting business began losing customers. By 22 February 1853 the Memphis Gas Company was supplying many residences and businesses with natural gas, but Fendler had known of the impending introduction of gas-lighting in Memphis the previous September, at which time he had planned tentatively to convert part of his business to the distillation of alcohol. Although on 15 August 1853 Fendler expressed some interest in exploring the Great Plains with Engelmann, he had already determined to move farther south to a German settlement in Venezuela known as Colonia Tovar. Business had declined too much for him to remain any longer in Memphis, but he told Engelmann that his main reasons for wanting to move to the village near Caracas were:

In a city with a population of 70,000 I believe to be able to find more security than here, and secondly, because I believe I shall have a better climate there. Then also, the wish to live again in a mountain valley and to be in the vicinity of a rich mountain flora! without having the difficulties of long and difficult communication as I found in Santa Fe I should think that the mountain area of Caracas should be rich in cactus species [15 August 1853].

Always eager to please Engelmann, Fendler also noted that the *Opuntia* plants that he had sown for him grew “very slowly” in his Memphis garden.

By 16 December 1854 the Fendlers had relocated to Colonia Tovar and were preparing nearly eight cases of specimens for Engelmann, including fifteen to twenty specimens each of 250 fern species and of six palm species. “You can imagine how much work this involves,” Augustus explained. “However, Lindley’s *Vegetable Kingdom* is a great help to me . . . [and] apart from the ferns, the colony contains orchids, Solanaceae, Rubiaceae, Melastomataceae in great numbers of species.” Meanwhile, he continued his meteorological observations, later receiving a barometer and dry and wet-bulb thermometers from Joseph Henry (Fendler to Engelmann, 27 April 1856). The description of the conditions that Fendler left behind in the United States would make any current weather report of the same area sound humdrum:

There is [at Colonia Tovar] no scorching summer’s heat, no fearful winter’s cold, neither tornadoes to devastate the country, nor gales to blind the inhabitants with sand or dust, or penetrate their clothes and flesh with piercing frost. Lightnings are rare and rather harmless, thunders merely grumbling (Canby, 1885).

The Fendlers designed a fountain next to their house, hollowing out a palm trunk and propping it so that the water could shoot up to nine feet in the air. Besides apple trees, bananas and palms, a vegetable garden provided them with potatoes and other staple foods. But since cash for sale of plant specimens merely trickled in from his friends in North America, Fendler resumed distilling alcohol to earn some income. Engelmann’s letter of 27 March 1856 heartened him with the news that a natural history society and a botan-

ical garden (Shaw's Garden) would soon be founded in St. Louis. "The reason I hope to end my life in the United States," Fendler wrote on 1 April of that year, "is the wish to follow the results of intensive scientific education. From the last I feel so far removed in Venezuela and in this regard I am very isolated."

During Fendler's visit to the United States later that month, Sullivant paid him for sets of mosses and liverworts; Tuckerman did likewise for lichens. However, LeConte would not buy Fendler's 600 "bugs" even though the entomologist thought them admirable specimens. He bought "only North American things. Therefore," wrote Fendler, "I shall keep them for myself."

By the time the Fendlers returned to St. Louis in 1864, Shaw's Garden had already been thriving for five years. Soon after arriving, the brothers established a small farm at Allenton, Missouri, not far from the city, and lived there for seven years. Augustus, however, did accept a short-term offer from Asa Gray to work as a curator at Cambridge, one of many abortive efforts by the elder botanist to alleviate his workload (Dupree, 1959). The negotiations began nearly a month after Abraham Lincoln's assassination and culminated in Fendler's move to Cambridge. He described his routine to Engelmann (2 November 1865):

During the day, which begins at 7½ in the morning until 5 o'clock in the evening, I work in the herbarium here where there is always work to do and of the *four* working days of which Gray wrote me earlier, nothing is said any more. I did not claim any time for myself, since I well know he would like me to lose as little time as possible. I did the sorting of Ranunculaceae to Rosaceae inclusive, according to the partly published work by Benth. and Hook. "Genera plantarum" and numbered the genera accordingly. The grasses according to Steudel; Labiatae, Scroph., Verb., Solanaceae, Compositae etc. according to DeCandolle. At present, I am working on the Cyperaceae. Gray still has a great number of bunches of dried East Indian plants from the Kew herbarium. Furthermore, several packages of Japanese plants: collected by Oldham, which will still have to be poisoned and pasted on white paper. Then, the plant parts of Wilke's expedition have to be looked at, labels to be

written for the duplicates. Furthermore, many plants, before being laid out for pasting, should be compared with those in the herbarium, whether there is still room on the old sheets and whether already a sufficient amount of specimens of one and the same species in the herbarium, in which case Dr. Torrey receives the duplicates. Also there are other collections to sort, for instance my own and that of Wright. From time to time, I also plant something small in the garden, keep the rooms of the herbarium clean, get charcoal out of the basement, etc. . . . Gray learned yesterday that the gardener demands \$5 per week for my board, he had only counted on \$4 at the most and does not want to give more in the future; and therefore I again have my meals at Gray's table where the midday meal is served at 5½.

This never worked out well because Fendler felt it a hardship to have to shave and dress well in the presence of "ladies" and because he preferred to eat alone. Gray accommodated Fendler's shyness and paid for his meals at a local boarding house.

Meanwhile Fendler had been considering two scientific topics, the theory of heat and the cause of fluctuation of barometric pressure from hour to hour that he had noticed in Venezuela. His lucubrations gave rise to the following remarks to Engelmann on 4 February 1866:

When I sent Prof. Henry my meteorological observations from Venezuela in June 1857, I sent them together with the half-hourly barometer readings and stated my theory about the cause of the periodical differences of the barometer In the report of the Smithsonian Institution of 1857 in which my observations and letters were published, this theory was left out, probably because Prof. Henry thought it too daring. Now, I find in one of the numbers (no. 114, p. 380) of the Journal of Science and Art that a Mr. Chase from Philadelphia arrived at the same result after three years of continuous hourly barometrical readings made by the request of Sabin during the years 1842-45, and proves this with a large algebraic account. The same will probably happen to my theory about the warmth [heat] if I cannot publish it soon.

Dr. Gray says I should write to Henry and ask him to return my manuscript in order to prove the priority of my theory.

[On 25 December 1865 Fendler had written Engelmann about the "warmth":] Gray obtained for me "Tyndall's Lectures on Heat considered as a mode of Motion" and I spent many evening hours reading this. I found that the experiments were carried out well and with great ingenuity. But the author did not succeed in proving that heat is nothing but a "mode of motion". I have several notes and could show direct contradictions and that he gets sometimes involved with problems from which he cannot extricate himself. I have never been able to see that warmth is something *material*; but neither can I believe that it is nothing but motion. I believe in my own opinions which I have not yet found in any work and intend to develop them later on when I am back home and have more time.

In Spring 1866 Augustus returned to help his brother farm at Allenton and continue his friendly collaboration with Engelmann. Unfortunately, he discovered that in his absence, his brother had developed night-blindness. In the summer of 1871, the brothers sold the farm and moved into St. Louis, an action that he later regretted because he found so few people there with whom he shared any interests. He loathed the city principally, he said, because of "the horrible noise, din and hurry of men adoring mammon." The wandering life of a collector certainly had turned him against city dwelling, too. St. Louis disagreed with him so much that he and his brother decided to visit Gumbinnen, Germany, in 1872. It was to be an extended vacation to judge from the four boxes of books they took with them.

However much he disliked living in St. Louis proper, his first letter to Engelmann from Germany indicated that Augustus Fendler missed the United States. Although the weather in East Prussia was exceptionally mild in 1872—so mild that he compared it to the idyllic Colonia Tovar—"Most everything here is more expensive than in America [and]," he continued to Engelmann (2 January 1873), "we don't like the still ever-present narrowminded spirit of the bourgeois, the soldier and officials, and my capital is not sufficient to live on." So Fendler planned again to return to America and bolstered his bo-

tanical knowledge by visiting the remarkable botanical gardens at Koenigsberg and Berlin. The former boasted its fine collection of aquatics, especially the attractive species of the Nymphaeaceae, whose foremost student, Prof. Johann Caspary, greeted Engelmann's friend with warmth. Professor Alexander Braun, a notable phycologist, drove Fendler through the Berlin garden where the young collector "was pleasantly surprised to see the large collection of living cactus plants with their strong and healthy growth." Braun also informed him that George Engelmann, Jr. had passed his doctoral examination.

On 4 April 1873, after only eleven months in Gumbinnen, the Fendlers left for Hamburg. They sailed with some 500 other passengers, mostly Scots and Irish, on the *Ismaila*, which arrived on 1 May in New York, one year to the day after they had disembarked at Hamburg. Finding that John Torrey had recently died, the Fendlers continued on their way to Philadelphia where Augustus renewed acquaintances with LeConte and Thomas Meehan, both of the Academy of Natural Sciences. Here Fendler planned to present "some small scientific papers" and so settled temporarily in the city. Again he grew restless and tired of city life and after some exploration of the environs of Philadelphia found lodgings in the rustic town of Seaford, Delaware, on the shores of the Nanticoke River. Seaford had "a bank, two hotels, three churches, one mill and two sawmills," and one other German. The oyster trade was "blooming" there, as Fendler wrote Engelmann on 16 February 1874.

The plants of the Coastal Plain, a phytogeographic region new to Fendler, interested him. He was especially startled to find that "this sandy and sterile looking soil can produce such huge oak trees as I have seen myself." Besides an income from interest on bonds that Fendler owned, supplemental cash soon came from a botanical source. William Marriott Canby, a wealthy railroad owner at Wilmington, Delaware, and collaborator of many botanists including Engelmann and Gray, soon "looked in" on Fendler at the urging of the former. Eventually Canby managed to persuade Fendler to move to Wilmington where the brothers bought a small house and established a fine garden. Canby employed Augustus in preparing and arranging herbarium specimens and enjoyed his conversation about the wonderful and curious vegetation of the tropics.

Meanwhile both Canby and Gray viewed with

growing dismay Fendler's attention to his "Mechanism of the Universe." So concerned was Gray that he wrote Engelmann on 19 June 1874: "I wish he had let Cosmical Science alone! But now he never will and is a gone goose." Gray's own practice of eschewing the metaphysical debates about Darwinism informed this judgment. Canby confirmed that "nothing could persuade him that this book was not to bring him everlasting fame and no reasoning could discourage him from undertaking the expenses of publishing this work" (Canby, 1885). Despite his reservations, Gray assessed Fendler's work in "Cosmical Science" in a more affirmative fashion later: "In the year 1874 he published at Wilmington, Delaware, where he then resided, at his own expense [about \$300] and, we suppose, with small returns, a well-written treatise (of 154 pages, 8vo) on 'The Mechanism of the Universe and its primary effort-exerting Powers; the Nature of Forces and the Constitution of Matter, with remarks on the Essence and Attributes of the All-Intelligent.' He was one of the ingenious race of paradoxers, and it may be left to the future De Morgan to characterize his work. He will certainly be lastingly and well remembered in botany" (Gray, 1884). Fendler was pleased enough that Joseph Henry bought a copy of the book.

On 15 April 1875 he told Engelmann that Gray had visited him and Charles C. Parry, too. Parry had cut his teeth as a collector in the Mexican Boundary Survey and was about to join Edward Palmer at San Luis Potosi in Mexico. Fendler hadn't seen Gray in ten years. Although he was glad to learn that Gray was now steadily churning out parts of the *Synoptical flora of North America*, he was surprised at how he had aged. This prompted some assessment of his own and Engelmann's situation (9 November 1875):

Even though Gray told me during our meeting last spring, that I still look as I did ten years ago, I feel the coming on of old age since next January I shall have completed my 63rd year. I believe you are five years older than I and Gray three years, Parry ten and Canby fifteen younger.

[And elsewhere:] You ask whether I am now satisfied with my life. It seems to be a natural trait in a human being who has moved around so much and so constantly, that he wishes to have a quiet home at least in his old age where he can spend the last days of his life without worries. I believe I have

reached this aim. Whatever I was looking for, I found. In the winter I am busy with literary works I like, in the summer plant collecting and I find much satisfaction and pleasure. Some times I have the desire, as in younger years, to go far into the woods and meadows and to read the '1000 flowers' which the earth offers in such abundance even in the most distant lands. Especially, I should like to see again the jungle of the tropical mountain areas where I once wandered and look up the old and well known vegetation in all its hiding places. But physical weakness from which I sometimes suffer, reminds me to stay quiet at home. However, I had given some serious thoughts to find enough subscribers to Venezuelan ferns to support such an enterprise financially. The Sea of Valencia with its beautiful and pleasant natural scenery, its picturesque surrounding hills and its incomparable lovely climate is very tempting to me and I should like to enjoy again the balsamic evening and morning air. However, I would only decide to take such a trip if the rheumatism which attacks me regularly during the winters in Delaware continues and makes my life miserable.

The next spring Fendler observed flowering and leaf veneration in oaks for Engelmann (Fendler to Engelmann, 16 May 1876); the two compared meteorological information over the next few years as well. Finally, however, the rheumatism that had plagued Fendler in recent years increased his discomfort so much that he decided to move to Trinidad where he hoped to both find relief and continue contributing to botany and meteorology in his final years. Engelmann asked him to pay close attention to the cacti there to which Fendler replied (6 May 1877):

In his *Flora of the British West Indian Islands*, Grisebach only described one single species of Cactaceae growing in Trinidad, namely *Rhipsalis Cassytha*. From all the British West Indian Islands, he had of *Mammillaria* 1, *Melocactus* 1, *Cereus* 7, *Rhipsalis* 2, *Opuntia* 5, *Peiriscia* [= *Pereskia*?] 1, all in all only 17 species. I very much doubt that this is the complete number.

Once in Trinidad Fendler wasted no time and sent Gray fifty sets of about seventy-five species each of ferns, which Gray described as "nice and

satisfactory.” Unfortunately, Fendler had no luck in finding cacti. However, he happily reported to Engelmann (26 August 1878) that he had “125 species [of ferns] in my own collection and intend to get up to 200 . . . [and] Euphorbiaceae are strongly represented [here].” Even in the 1870s tropical forests were being ravaged by progress, and Fendler lamented: “Here in Trinidad, a small railroad is being built (the second one); it is a pity that I did not learn about this earlier so that I could have been present at the cutting down of the trees.” Despite this and his general disgust with the “folly and rancor of the surging multitude” both in Trinidad and in Delaware (an event that reinforced this shortly before he left Wilmington will be recounted momentarily), Fendler still felt that his final days just might be a little idyllic. “The time for the mangos and breadfruit has almost past,” he wrote in August, “but the branches of the two orange trees are bending down already under the burden of their fruit which will not be ripe until October.” He later reported (6 January 1881) that he and his brother customarily ate 5 to 6 oranges daily (over 1200 oranges from their trees in six months), numerous plantains and pure chocolate that they prepared themselves from the cocoa beans they grew.

Shortly before Fendler had left Delaware the police had been alerted by some ignorant people who, presumably unaware of the profession of plant collecting, suspected the Fendlers of counterfeiting money. Consequently, the over-zealous officers searched the house and even dug up the garden in search of contraband. Finding nothing they, nevertheless, left everything a mess. After arriving in Trinidad, Fendler wrote Canby: “That this little affair weighed heavily upon my mind and gnawed deep into my immoderately sensitive feelings, you may well imagine.”

On 26 March 1879 Fendler’s compassionate heart went out to his bereaved friend in St. Louis who had informed Augustus in his 27 February letter of the death of his wife. Fendler could only:

hope that the hand of your son will heal better than you think and also that your health will be improved in the meantime, so that you can still count on a long and fruitful life. It must be a comfort to you that you are surrounded by many admirers and friends and that you enjoy all the comforts a human being craves.

Engelmann, in his turn, counseled his friend

that he was too sensitive, nervous and easily upset. Fendler responded (6 September 1879):

Why I am concerned with the rabble which surrounds me constantly and which only reminds me too vividly of the degradation of the human race into animals or the opposite, from an animal to a human being [I do not know], but the disgusting impressions remain the same. Fortunately, the masses have not much to say in this country.

[Other things also occupied his mind, however.] For the last 35 years since we became friends, I never lost track of your successful career. That your usual good health is becoming worse is probably due to the late sad events and I hope that you will be well again soon From the New York Tribune I see what tremendous progress the ‘far west’ especially Colorado is making lately, especially with regard to population and wealth. If one thinks back of the times and conditions of the regions of the territories west of the Mississippi when we came to St. Louis, I in 1838 and you even earlier, it seems that the developments made during the last years are as wonderful as the tales from ‘1000 and one night[s]’. But how will things look in the United States after another 40 years?

In 1881 Engelmann traveled to the “far west” and reported to Fendler his observations on his trip from San Francisco to Vancouver on a steamer. In the meantime Fendler kept collecting and also occupied himself with weather data. He helped Henry Prestoe, Superintendent of the Port-of-Spain Botanic Gardens (1864–1886), “figure out the average numbers of his fourteen years of meteorological observations” and sometimes worked for him as a clerk, that “spirit-killing” occupation. Fendler was glad to hear from Engelmann that George W. Letterman had “become such an eager and energetic collector and observer, especially, since, as you say, I gave him the first push” (Fendler to Engelmann, 6 July 1881). But when Engelmann informed him that F. J. Lindheimer, the long-time collector that Fendler had met in Houston in 1839, had died in 1879, Fendler was reminded once more of his own frail condition. Augustus even may have suffered a mild heart attack “lifting a wooden fence” that he and his brother “tried to put into the right place.” He described it thus:

I injured myself (apparently my chest and

back) and then immediately suffered from an attack of rheumatism, from which I have not yet recovered. The pains in the chest are a great nuisance sometimes, especially if they occur around the heart (6 July 1881).

In the same letter he learned that Engelmann's health was not improving either. However, none of this deterred him from exploring Trinidad. He regaled Canby (1885) with an amusing tale of his encounter with a local dealer in what, from all appearances, had to be hallucinogenic drugs:

Having ascended one of the highest ridges of the Saut d'eau mountains, about ten miles from town, I took occasion to visit a man known all about as Popo Fernand (though his real name is Joseph Isidore), in order to inquire of him about a piece of land that was offered for sale in his neighborhood. On my way thither I was astonished to find that in and beyond the village of Maraval every man, woman and child knew where the man lived, though his cabin was miles away in the mountains in an out-of-the-way place. When I at last reached his premises I found no one there, but noticed, as something unusual, a great number of beehives stuck all around his cabin and outhouses, the first beehives that I have seen in Trinidad. After a while a woman came up and called aloud Fernand's name. He soon made his appearance. Neither he nor any of his neighbors could speak English and I could not speak their language The man seemed, however, to be courteously disposed. In order to see how the land lay, I exposed my little pocket compass in his presence, when at once he seemed to become alarmed, and made me understand that he thought the instrument was intended to show the spot where money was hid in the ground. Of this notion I tried to disabuse him. Soon after he invited me into his room and, as is customary here . . . he asked me to help myself to the contents of a small bottle he set before me. Not to show any signs of distrust, I poured out about two thimblefuls of the liquor, mixing it with plenty of water, but became somewhat suspicious after drinking it on noticing that Fernand himself had not taken any of the bottle's contents. About ten minutes later, on my way back, I experienced a strange state of mind such as never before I had happened to be in. There were neither diz-

ziness, stupefaction nor exhilarating symptoms. Visions and strange incoherent thoughts flashed across my mind continually and vanished at once as quickly as they came. Any theme I made an effort to think upon slipped from my memory, and instead thereof quite a different theme presented itself with the same futile result, until I became frightened at my own thoughts and terrified at my condition of mind. After a two hours brisk and steady walk this unpleasant irritation of mind gradually subsided What would have been the result had I taken a little more of that liquor?

In the summer of 1881 Fendler informed Engelmann that he had sent J. D. Hooker five sets of his phanerogams. So Kew also was reaping part of Fendler's harvest. But they had done so before. In fact, years earlier Hooker had written Gray praising Fendler's Santa Fe specimens (Dupree, 1959). Augustus also remarked that Henry Shaw seemed to be one of those long-lived people who might reach his father's age, near ninety. He fondly recalled and inquired about Shaw's sister and brother-in-law. A year later, 20 July 1882, his last letter to Engelmann (that we know of) states:

I received your letter of May 24th on June 20th and was glad to learn that you did not suffer from rheumatism for quite a while. What I mistakenly thought was rheumatism, when I wrote you my last letter on January 4th, turned out to be a congestion of the liver, a dangerous one, as the doctor told me; after taking the medicine he prescribed I felt quite well several weeks later.

Lately, however, I don't have much appetite which is probably the result of the continuous heat and humidity, I also suffer from a weakness in all bones and especially the back. I believe, too, that a higher area would be better for my health, about 4000 to 5000 feet above sea level. I also should like to visit Colonia Tovar again and collect ferns there and am waiting for a reply to my letters to several gentlemen with regard to the sale of these, and also to learn something about the present condition of the colony. It was destroyed several years after I left there; I have not yet been able to find out whether it was rebuilt again. [He provided some weather data, promised him a specimen of

Mamillaria papyracantha, and observed that] we expect to have streetcars in Port of Spain which will be a great convenience for me.

Fendler may have enjoyed the trolleys for a short time, but he never returned to Colonia Tovar nor did he ever find his utopian farm in the backlands of Trinidad. Death struck him down on 27 November 1883. His life-long friend Engelmann had a memorandum of this event (how recently arrived is not known) on his desk at the time that he died, namely 4 February 1884; Fendler was 71, Engelmann 76 (Gray, 1885).

Canby had written in 1885 that only "brief notices" about Augustus Fendler had appeared in scientific periodicals since his death, "but scarcely such as so excellent a man and one so useful to science deserved." Perhaps these selections from his letters to Engelmann will lengthen the deserved notices about this man so beloved of Canby, Gray and Engelmann. (For the most recent bibliography on Fendler's life and works, see Stafleu and Cowan, 1976, vol. 1, pp. 822, 823, 990).

LITERATURE CITED

CANBY, W. M. (editor). 1885. An autobiography and some reminiscences of the late August Fendler. I,

Bot. Gaz. 10: 285–290; II, Bot. Gaz. 10: 301–304; III, Bot. Gaz. 10: 319–322.

DUPREE, A. H. 1959. Asa Gray, 1810–1888. The Belknap Press of Harvard Univ. Press, Cambridge.

GRAY, A. 1849. *Plantae fendlerianae novi-mexicanae*. Mem. Amer. Acad. Arts, ser. 2, 1: 1–116.

———. 1884. General notes. Necrology. Bot. Gaz. 9(7): 111–112.

———. 1885. Botanical necrology for 1884. Augustus Fendler, George Englemann, S. B. Buckley, J. Williamson, J. H. Balfour, H. R. Goepfert, George Bentham. Amer. J. Sci., ser. 3, 29(129): 169–172.

McKELVEY, S. D. 1955. Botanical Exploration of the Trans-Mississippi West. 1790–1850. The Arnold Arboretum, Jamaica Plain.

SHAW, E. A. 1982. Augustus Fendler's collection list: New Mexico, 1846–1847. Contr. Gray Herb. 212: 1–70.

STAFLEU, F. A. & R. S. COWAN. 1976. Taxonomic Literature, 2nd edition, Volume 1. Bohn, Scheltema & Holkema, Utrecht.

STIEBER, M. T. 1982. Register of plant collectors' field notes held in North American institutions. Huntia 4(3): 151–202.

ARCHIVAL SOURCES

Letters from Augustus Fendler to George Engelmann, compiled and translated by Carla Lange. 87 typed pp. In the Library, Missouri Botanical Garden. Copy at Hunt Institute. Original letters at Missouri Botanical Garden.